IV. Application

A. Predictions

1. Predict what would happen to the coastal areas of the Atlantic Ocean if El Ninos developed off the coast of Africa.

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2. Predict the effect of a severe El Nino on the salinity (saltiness) of the northern Gulf of Mexico and write the reason for the effect on salinity.

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3. Predict what would happen to the US Southwest if an El Nino increased the sea surface temperature by 3 degrees and the increase in temperature extended across the whole Pacific Ocean.

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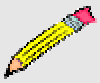
4. Using the dates of previous El Ninos, predict when the next El Nino will occur.

_____

- Click "Back" until you get back to the OAR El Nino Activity.

V. Enrichment Activities

A. Wind Patterns



1. If your class has covered global winds, explain in detail why El Nino sea surface temperatures affect weather patterns and where the effects occur.

B. Social Studies / Language Arts

- Click on the "Economic Impacts" site.

- Read the data and write an explanation of the economic impacts of an El Nino event.

- Click "Back" until you get back to the OAR El Nino Activity.

C. Math

Predict the effect of 1997 El Nino on Rockhampton Australia based on the departure from normal of the sea surface temperature during the 1982 El Nino

- Click on the "Rainfall" site to return to the Rockhampton data.
- Choose "graph total precipitation each year for a period of years".
- Click on the picture of Australia.

- Click "Okay".
- At the "Select a station" page, scroll down and select Rockhampton Airport.

- Scroll down to the "Select a Time Period to Graph" section.
- Enter the years 1955 and 1988 in the boxes.
- Click "Graph Data".

- Scroll down to and click on "View the dataset".

- Follow the directions below to compare the abnormal sea surface temperature during the 1982/83 El Nino on the "Comparison of Different El Ninos" page and the rainfall amount for the year in Rockhampton.

1. Average the rainfall amounts for Rockhampton Australia for the years 1955 - 1989 to obtain an average yearly rainfall. Record the average below.

Average Yearly Rainfall = _____cm.

2. Average the rainfall for 1982 and 1983, then record the 82/83 average below.

1982 /1983 Rainfall =_____cm.

3. Subtract the 82/83 rainfall from the average rainfall, then record the difference below.

Deviation from Normal =_____ cm.

- Click "Back" 4 times to get back to the OAR El Nino Site.
- Click on the El Nino comparison graph site.
- Scroll down to the bottom of the site to see the graph of El Ninos.

4. Find the 1982 /83 abnormality in temperature measured at the March/April closest to the middle of the graph. Record the temperature abnormality below.

Temperature Difference =_____ degrees.

5. Divide the Deviation from Normal by the Temperature Difference. This gives you a number telling you how much the rainfall should increase for each degree that the sea surface temperature is above normal. Record the answer below.

Rainfall Increase per Degree =_____ .

- Follow the directions below. Use your calculations above to predict what the rainfall increase will be in Rockhampton, Australia during the March / April period If an El Nino occurred that was 4.1 degrees above normal.

6. Multiply your Rainfall Increase per Degree value times the 4.1 degree increase. See example below.

   Rainfall Increase per Degree x 4.1 = Predicted Rainfall

Your answer to step 6 will give you an idea of how much additional rain will fall (above normal) in Rockhampton if an El Nino of 4.1 degrees above normal were to happen.

D. Research

1. Research other El Ninos using the Internet. Here's an idea of information to look for;
   a. When it occurred
   b. How long it lasted
   c. What countries and areas were most and least affected?
   d. What happened to the weather as a result of each one?
   e. On a map, draw the greatest sea surface area covered by the El Nino.

2. Collect newspaper and magazine articles about El Nino. Write a brief summary of each one.

3. Find out the differences between El Nino, La Nina, and El Viejo.

E. Interviews

1 Interview local weather people about the reports they have done on El Ninos.

2. Interview 10 individuals to find out how much they know about El Ninos and what effect they think El Nino has on the weather. Develop eight to ten questions and write them out leaving space to write their answers.

F. Class Reports

1. Prepare a two-minute news report on El Nino. If you have a video camera, film your report. Interview one "expert" in your report.

2. Create a series of drawings on a map showing the increase and decrease in the area (size) covered by the 1997 El Nino. Make sure you include the date of the drawing on each drawing.

G. Related Web Sites

1. "Comparison of Different El Ninos" graph
   http://www.cdc.noaa.gov/ENSO/enso.different.html
2. El Nino Theme Page
   http://www.pmel.noaa.gov/toga-tao/el-nino
3. A Globe Activity - El Nino vs. Non-El Nino Years
   http://www-co-cas.colorado.edu/oasis/science/mods/ElChange.html
4. "El Nino Climate Anomalies can be Predicted Several Seasons in Advance"
   http://www.ncdc.noaa.gov/ogp/papers/cane.html
5. Animation of an El Nino Event - you'll need an MPEG viewer program to view the animation.
   http://www.pmel.noaa.gov/toga-tao/mpeg/TAO_SST_Wind.mpeg
6. USA Today El Nino web site
   http://www.usatoday.com/weather/nino.wnino0.htm